

Application Serial No. 10/612,125
Amendment Dated October 28, 2006
Reply to Office Action of June 28, 2006

REMARKS/ARGUMENTS

Claims 1 - 50 are pending in the present application. Claims 28 and 33 were amended, canceled or added. Reconsideration of the claims is respectfully requested. Claims 1, 25, 28, 33 and 41 are independent.

I. 35 U.S.C. § 102, Anticipation

The Examiner has rejected claims 1 - 4, 14 - 16, 23 - 29 and 33 - 50 under 35 U.S.C. § 102(b) as being anticipated by West. This rejection is respectfully traversed.

The examiner is reminded that a prior art reference anticipates the claimed invention under 35 U.S.C. § 102 only if every element of a claimed invention is identically shown in that single reference, arranged as they are in the claims. *In re Bond*, 910 F.2d 831, 832, 15 U.S.P.Q.2d 1566, 1567 (Fed. Cir. 1990). All limitations of the claimed invention must be considered when determining patentability. *In re Lowry*, 32 F.3d 1579, 1582, 32 U.S.P.Q.2d 1031, 1034 (Fed. Cir. 1994). Anticipation focuses on whether a claim reads on the product or process a prior art reference discloses, not on what the reference broadly teaches. *Kalman v. Kimberly-Clark Corp.*, 713 F.2d 760, 218 U.S.P.Q. 781 (Fed. Cir. 1983).

Claims 1 - 4, 14 - 16, 23 - 29:

With regard to claims 1 - 4, 14 - 16 and 23 - 29, the present invention is directed to a method, imaging apparatus and computer program product for enhancing dynamic range of data read from an imaging sensor. The imaging sensor comprising N linear pixel arrays, each of the N linear arrays having M ***dependently controlled charge coupled pixels***, each pixel charge coupled, and further being coupled to one of N ***registers***.

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1. West does not teach or suggest "combining charge from a first dependently controlled region of the N linear pixel arrays of the imaging sensor in the N registers by shifting charge from the first dependently controlled region along each of the N linear pixel arrays to each of the N registers..." and "combining charge from a second dependently controlled region of the N linear pixel arrays in the N registers by shifting charge from the second dependently controlled region along each of the N linear pixel arrays to each of the N registers, said first and second dependently controlled regions having at least three pixel lines, and said at least three pixel lines being oriented in generally orthogonal direction to the N linear pixel arrays," as recited in claims 1, 25 and 28:

In the Office Action, and in subsequent telephonic interview, the examiner made several allegations that some claim language subsequent to the limitation of "combining charge from a first dependently controlled region ... in the N registers," nullifies the requirement of combining charge in the N registers and/or, alternatively, the present claim leaves open the probability of accumulating charge in a row of N cells in addition to the N registers. Applicant respectfully disagrees with the first assertion by the examiner and respectfully asserts that the second allegation is moot in view of the reference not teaching each and every limitation of present claims as require under 35 USC 102.

The present claims recite "combining charge from a first dependently controlled region of the N linear pixel arrays of the imaging sensor..." and also "combining charge from a second dependently controlled region of the N linear pixel arrays in the N registers" ... "said first and second dependently controlled regions having at least three pixel lines, and said at least three pixel lines being oriented in generally orthogonal direction to the N linear pixel arrays." The claims recite that at least two pixel lines from one of the first region or second region is combined in the N registers (i.e., at least one

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pixel line from one region and two pixel lines from the other region). Hence, at least two pixels from the N arrays of one of the first region or second region are combined in the N registers. Therefore, the claims require that more than one pixel line be combined in the N register.

In contrast, and as stated before, West explicitly discloses combining charge from any of band 401, 402, 403 and 404, above split 303, and into pixel row 406. West does not teach or suggest combining charge in registers 304 as recited in the claims. See col. 4, lines 3 – 59. Furthermore, West explicitly states that the charge in region 302 is shifted one row at a time to be read from the registers:

In order to shift out the multiple spectra, the four rows 405a are binned into row 406, the first row above the split 303. The row 406 would then be shifted one row upward, thereby allowing the binning of the next four rows of dark charge from region 405a into row 406. See col. 4, lines 48 - 52.

Therefore, West teaches expressly teaches to combine charge only in a pixel row adjacent to the split and teaches away from combining charge in the registers.

2. West does not teach or suggest “an imaging sensor comprising N linear pixel arrays, each of the N linear arrays having M dependently controlled charge coupled pixels, each pixel charge coupled, and further being coupled to one of N registers ...” nor does it teach or suggest “shifting charge from the first dependently controlled region along each of the N linear pixel arrays to each of the N registers...” and “shifting charge from the second dependently controlled region along each of the N linear pixel arrays to each of the N registers ...” as recited in claims 1, 25 and 28:

The present claims recite first dependently controlled region of the N linear pixel arrays and a second dependently controlled region of the N linear pixel arrays. Since the pixels in the N arrays or the first and second regions are dependently controlled, the

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pixels of the first and second regions shift in unison in response to a shift command. By contrast, West expressly teaches a first independently controlled region of pixel rows and a second independently controlled region of pixel rows which are separated by a split between the pixel rows. This split enables one region to be independently controlled from any other region; hence the regions of West's device are not dependently controlled. Moreover, it is not immediately clear how the West's special purpose device could function with two *dependently* controlled regions as is recited in the claims.

The examiner bears the burden of establishing a *prima facie* case of anticipation. *In re King*, 801 F.2d 1324, 1327, 231 USPQ 136, 138439 (Fed. Cir. 1986). Each claim in issue must first be correctly interpreted to define the scope and meaning of each limitation. *In re Paulsen*, 30 F.3d 1475, 1479, 31 USPQ2d 1671, 1674 (Fed. Cir. 1994). The prior art reference must disclose each element of the claimed invention, as correctly interpreted, and as "arranged in the claim." *Lindermann Maschinentabrik GmbH v. American Hoist & Derrick Co.*, 730 F.2d 1452, 221 USPQ 481, 485 (Fed. Cir. 1984).

It is respectfully asserted that West does not teach or suggest, at least, combining charge in the registers as recited in at least claims 1, 25 and 28, and therefore the rejection of claims 1, 25 and 28 is improper and should be immediately withdrawn.

Since claims 2 - 4, 14 - 16 and 23, 24, 27 and 29 depend from claims 1, 25 and 28, the same distinctions between West and the claimed invention in claims 1, 25 and 28 exists for these claims. Additionally, claims 2 - 4, 14 - 16 and 23, 24, 27 and 29 claim other additional combinations of features not suggested by the reference. Consequently, it is respectfully urged that the rejection of claims 1 - 4, 14 - 16 and 23 - 29 have been overcome.

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Therefore, the rejection of claims 1 - 4, 14 - 16 and 23 - 29 under 35 U.S.C. § 102 has been overcome.

Claims 33 - 40:

With regard to claims 33 - 40, the present invention is directed to a method for reading data from an imaging sensor. The imaging sensor comprising N linear pixel arrays, each of the N linear arrays having M *dependently controlled charge coupled pixels*, each pixel charge coupled, and further being coupled to one of N *registers*.

1. West does not teach or suggest "an imaging sensor, said imaging sensor comprising N linear pixel arrays, each of the N linear arrays having M dependently controlled charge coupled pixels, each pixel charge coupled, and further being coupled to one of N registers ..." and then "shifting charge from the at least some pixels of the first and second dependently controlled regions of the N linear pixel arrays along a linear path into said dark dependently controlled region of the N linear pixel arrays of the imaging sensor ..." as recited in claims 33:

The present claims recite a first dependently controlled region of the N linear pixel arrays, a second dependently controlled region of the N linear pixel arrays and also a dark dependently controlled region of the N linear pixel arrays of the imaging sensor. After charge is integrated in at least some pixels of the first region and second dependently controlled regions, the charge is shifted "*from* the at least some pixels of the first and second dependently controlled regions of the N linear pixel arrays along a linear path *into* said dark dependently controlled region." The charge is then available in the dark region to be read out without the possibility of light contamination. West does not teach or suggest shifting charge *from* two separately defined dependently controlled regions and *into* a dark region.

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West teaches, and the Examiner affirms in paragraph 24 of the Office Action, shifting charge *through* separately defined dark zones 405a, 405b, 405c and 405d. However, the Examiner asserts that merely shifting a single spectrum through a dark zone meets the claim limitation ("The charges from the second region 402 must be shifted through a dark region 405a to be binned in the single row 406"). Applicant respectfully asserts that while this statement may be true, it this does not teach or suggest the presently claimed limitations and therefore West cannot anticipate claim 33. The claims clearly recite that the charge from two regions is shifted into the dark region.

Furthermore, West teaches that the spectra bands, 401 through 404 are at least as wide as dark zones 405a, 405b, 405c and 405d defined therebetween. Consequently, even if the spectra bands are shifted *through* a dark zone, no dark zone is large enough to hold portions of two separate spectra. Hence, dark region 405a would not ever contain parts of two spectra, for instance, portions of spectra bands 410 and 402. Therefore, West does not teach or suggest "shifting charge *from* the at least some pixels of the first and second dependently controlled regions of the N linear pixel arrays along a linear path *into* said dark dependently controlled region," as recited in claim 33.

Still further, West describes defining the dark zones as an isolation barrier between the spectra to avoid contaminating the individual spectrum during integration and not, as in the presently claimed invention, as a place to hold spectra after the integration and prior to reading out charge from the dark region. Therefore, while West may teach shifting charge through the dark regions, it does not teach or suggest "shifting charge *from* the at least some pixels of the first and second dependently controlled regions of the N linear pixel arrays along a linear path *into* said dark dependently controlled region," and then "reading out charge from said dark dependently controlled region, said charge from said dark dependently controlled region having been shifted from each dependently controlled region defined on the N linear

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pixel arrays of the imaging sensor." At best, West teaches merely shifting charge through the dark zone from one spectra band.

It is respectfully asserted that West does not teach or suggest, at least, "shifting charge *from* the at least some pixels of the first and second dependently controlled regions of the N linear pixel arrays along a linear path *into* said dark dependently controlled region," nor does West teach "reading out charge from said dark dependently controlled region, said charge from said dark dependently controlled region having been shifted from each dependently controlled region defined on the N linear pixel arrays of the imaging sensor," as recited in claim 33. Therefore, the rejection of claim 33 is improper and should be immediately withdrawn.

Since claims 34 - 40 depend from claim 33, the same distinctions between West and the claimed invention in claim 33 exists for these claims. Additionally, claims 34 - 40 claim other additional combinations of features not suggested by the reference. Consequently, it is respectfully urged that the rejection of claims 34 - 40 have been overcome.

Therefore, the rejection of claims 33 - 40 under 35 U.S.C. § 102 has been overcome.

Claims 41 - 50:

With regard to claims 41 - 50, the present invention is directed to a method for reading data from an imaging sensor. The imaging sensor comprising N linear pixel arrays, each of the N linear arrays having M *dependently controlled charge coupled pixels*, each pixel charge coupled, and further being coupled to one of N *registers*.

1. West does not teach or suggest "an imaging sensor, said imaging sensor comprising N linear pixel arrays, each of the N linear arrays having M

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dependently controlled charge coupled pixels, each pixel charge coupled, and further being coupled to one of N registers ...” and then “shifting charge from the at least some pixels of the first and second dependently controlled regions of the N linear pixel arrays along a linear path into said dark dependently controlled region of the N linear pixel arrays of the imaging sensor ...” and “combining charge integrated in the first dependently controlled region of the N linear pixel arrays of the imaging sensor in the N registers by shifting charge from the dark dependently controlled region along each of the N linear pixel arrays to each of the N registers,” and also “combining charge integrated in the second dependently controlled region of the N linear pixel arrays of the imaging sensor in the N registers by shifting charge from the dark dependently controlled region along each of the N linear pixel arrays to each of the N registers,” as recited in claims 41:

Here again, the present claim recites a first dependently controlled region of the N linear pixel arrays, a second dependently controlled region of the N linear pixel arrays and also a dark dependently controlled region of the N linear pixel arrays of the imaging sensor. After charge is integrated in at least some pixels of the first region and second dependently controlled regions, the charge is shifted “*from* the at least some pixels of the first and second dependently controlled regions of the N linear pixel arrays along a linear path *into* a dark dependently controlled region of the N linear pixel arrays of the imaging sensor.” Thus, it is respectfully asserted that the rejection of claim 41 is improper for the same reasons as discussed above with regard to claim 33.

The present claims also recite “combining charge integrated in the first dependently controlled region of the N linear pixel arrays of the imaging sensor in the N registers by shifting charge from the dark dependently controlled region along each of the N linear pixel arrays to each of the N registers,” and also “combining charge

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integrated in the second dependently controlled region of the N linear pixel arrays of the imaging sensor in the N registers by shifting charge from the dark dependently controlled region along each of the N linear pixel arrays to each of the N registers," where "said first and second dependently controlled regions having at least three pixel lines, and said at least three pixel lines being oriented in generally orthogonal direction to the N linear pixel arrays." Thus, the claims recite that at least the charge from two pixel lines from one of the first region or second region is combined in the N registers from the dark region (*i.e.*, at least one pixel line from one region and two pixel lines from the other region). Hence, at least the charge from two pixels from the N arrays of one of the first region or second region is combined in the N registers. Therefore, the claims require that more than one pixel line be combined in the N register, as also discussed above with regard to claims 1, 25 and 28.

It is respectfully asserted that West does not teach or suggest, at least, "shifting charge *from* the at least some pixels of the first and second dependently controlled regions of the N linear pixel arrays along a linear path *into* a dark dependently controlled region of the N linear pixel arrays of the imaging sensor," nor "combining charge integrated in the first dependently controlled region of the N linear pixel arrays of the imaging sensor in the N registers by shifting charge from the dark dependently controlled region along each of the N linear pixel arrays to each of the N registers," nor "combining charge integrated in the second dependently controlled region of the N linear pixel arrays of the imaging sensor in the N registers by shifting charge from the dark dependently controlled region along each of the N linear pixel arrays to each of the N registers," and therefore the rejection of claim 41 is improper and should be immediately withdrawn.

Since claims 42 - 50 depend from claim 41, the same distinctions between West and the claimed invention in claim 41 exists for these claims. Additionally, claims 42 - 50 claim other additional combinations of features not suggested by the reference.

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Consequently, it is respectfully urged that the rejection of claims 42 - 50 have been overcome.

Therefore, the rejection of claims 41 - 50 under 35 U.S.C. § 102 has been overcome.

II. Objection to Claims

The Examiner has stated that claim 28 which has been amended according to the Examiner's suggestions. In response, the claims have been rewritten to overcome this objection.

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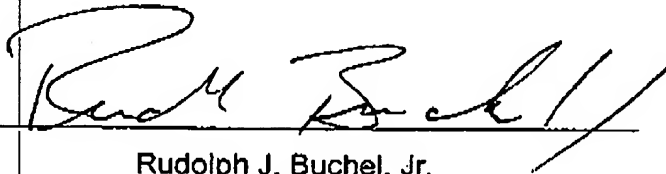
III. Conclusion

It is respectfully urged that the subject application is patentable over West and is now in condition for allowance.

The Examiner is invited to call the undersigned at the below-listed telephone number if in the opinion of the Examiner such a telephone conference would expedite or aid the prosecution and examination of this application.

Respectfully submitted,

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